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Patent  
8,616,919-US  
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APPLICANT(S): ROSENBERG, Robert D. , et. al.

SERIAL NO. /

PATENT NO.: 09/557,262

EXAMINER:

Ram R. Shukla

FILED / ISSUED: April 24, 2000

GROUP ART UNIT: 1632

FOR:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFTRANSFERASES,  
AND USES THEREFOR

**POWER OF ATTORNEY AND**  
**REVOCATION OF PRIOR POWERS BY ASSIGNEE**

Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Massachusetts Institute of Technology, the assignee of record of the entire right, title and interest in and to the above-identified Application, hereby revokes any and all prior Powers of Attorney;

and hereby appoints the following attorneys and/or agents with full Power of Substitution and Revocation to prosecute this Application, to make alterations and amendments therein, to receive the patent and to transact any and all business in or with the United States Patent and Trademark Office in connection therewith, provided that if any one of said attorneys or agents ceases being affiliated with the law firm of Eitan, Pearl, Latzer & Cohen Zedek, LLP. as partner, employee or of counsel, such attorney's or agent's appointment as attorney or agent and all powers derived therefrom shall terminate on the date such attorney or agent ceases being so affiliated.

Mark S. Cohen	Reg. No. 42,425
Caleb Pollack	Reg. No. 37,912
Vladimir Sherman	Reg. No. 43,116
Guy Yonay	Reg. No. 52,388

Please send all correspondence and direct all telephone calls to Mark S. Cohen of:

Eitan, Pearl, Latzer & Cohen Zedek, LLP.  
10 Rockefeller Plaza  
Suite 1001  
New York, New York 10020  
Tel: (212) 632-3480  
Fax: (212) 632-3490

Attached to this paper is a STATEMENT UNDER 37 CFR 3.73(b).

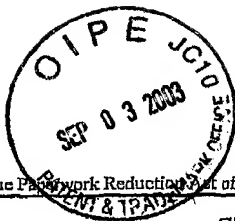
Respectfully submitted,

Date: 8/28/03

By: Rita M. Filipowicz

Name: Rita M. Filipowicz

Title: Patent Administrator



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PTO/SB/96 (6-98)

Approved for use until 09/30/2000, OMB 0551-0031  
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**STATEMENT UNDER 37 CFR 3.73(b)**Applicant/Patent Owner: **ROSENBERG, Robert D.**Application No./Patent No.: **09/557,262**Filed/Issue Date: **April 24, 2000**Entitled: **HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFTRANSFERASES, AND USES THEREFOR**

Massachusetts Institute of Technology, a University

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

States that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of an undivided part interest

in the patent application/patent identified above by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the Patent and Trademark Office at Reel 011174, Frame 0854, or for which a copy thereof is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

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Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

3. From: \_\_\_\_\_ To: \_\_\_\_\_

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Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.☐ Additional documents in the chain of title are listed on a supplemental sheet.

- ☒ Copies of assignments or other documents in the chain of title are attached.

[NOTE: A separate copy (i.e., the original assignment document or a true copy of the original document) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the PTO. See MPEP 302-302.8]

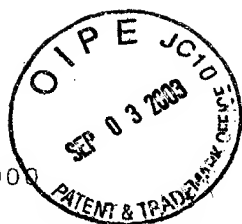
The undersigned (whose title is supplied below) is empowered to sign this statement on behalf of the assignee.

8/28/03  
DateRita H. Filipowicz  
SignatureRita H. Filipowicz  
Typed or printed namePatent Administrator  
Title

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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TECH CENTER 1600/2900

DECEMBER 19, 2000

TESTA, HURWITZ & THIBEAULT, LLP  
MAUREEN A. BRESNAHAN  
125 HIGH STREET  
HIGH STREET TOWER  
BOSTON, MA 02110

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\*101497993A\*

DEC 29 2000

PATENT DEPARTMENT

TESTA, HURWITZ & THIBEAULT, LLP

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PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 703-308-9723. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, ASSIGNMENT DIVISION, BOX ASSIGNMENTS, CG-4, 1213 JEFFERSON DAVIS HWY, SUITE 320, WASHINGTON, D.C. 20231.

RECORDATION DATE: 10/16/2000

REEL/FRAME: 011174/0854  
NUMBER OF PAGES: 20

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).

ASSIGNOR:

ROSENBERG, ROBERT D.

DOC DATE: 08/21/2000

ASSIGNOR:

SCHWORAK, NICHOLAS W.

DOC DATE: 09/07/2000

ASSIGNOR:

LIU, JIAN

DOC DATE: 08/23/2000

ASSIGNOR:

FRITZE, LINDA M. S.

DOC DATE: 08/31/2000

ASSIGNOR:

SCHWARTZ, JOHN J.

DOC DATE: 08/16/2000

ASSIGNOR:

ZHANG, LIJUAN

DOC DATE: 09/29/2000

011174/0854 PAGE 2

ASSIGNEE:

MASSACHUSETTS INSTITUTE OF  
TECHNOLOGY  
77 MASSACHUSETTS AVENUE  
CAMBRIDGE, MASSACHUSETTS 02139

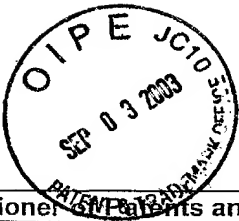
SERIAL NUMBER: 09557262

PATENT NUMBER:

FILING DATE: 04/24/2000

ISSUE DATE:

TARA WASHINGTON, EXAMINER  
ASSIGNMENT DIVISION  
OFFICE OF PUBLIC RECORDS



10-27-2000



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☐ Resubmission (Non-Recordation)

Document ID#:

☐ Correction of PTO Error

Serial #:  Frame #:

☐ Corrective Document

Serial #:  Frame #:

Conveyance Type

☒ Assignment

☐ License

☐ Merger

☐ Security Agreement

☐ Change of Name

☐ Other

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☐ Departmental File

☐ Secret File

Conveying Party(ies)

☐ Mark if additional names of conveying parties attached

Name  Robert D. Rosenberg

Execution Date  
Month Day Year

8/21/2000

Name  Nicholas W. Schworak

9/7/2000

Name  Jian Liu

8/23/2000

Name  Linda M.S. Fritze

8/31/2000

Name  John J. Schwartz

8/16/2000

Name  Lijuan Zhang

9/29/2000

Receiving Party

☐ Mark if additional names of receiving parties attached

Name (line 1)  Massachusetts Institute of Technology

☐ If document to be recorded is an assignment and the receiving party is not domiciled in the United States, an appointment of a domestic representative is attached. (Designation must be a separate document from Assignment)

Name (line 2)  77 Massachusetts Avenue

Address (line 1)

Address (line 2)

Address (line 3)  Cambridge

MA

02139

City

State/Country

Zip Code

Domestic Representative Name and Address

Enter for the first Receiving Party only.

Name

Address (line 1)

Address (line 2)

Address (line 3)

Address (line 4)

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## Correspondent Name and Address

Area Code and Telephone Number 617/248-7000

Name Patent Administrator

Address (line 1) Testa, Hurwitz &amp; Thibault, LLP

Address (line 2) High Street Tower

Address (line 3) 125 High Street

Address (line 4) Boston, MA 02110

Pages Enter the total number of pages of the attached conveyance document including any attachments.

## Application Number(s) or Patent Number(s)

☐ Mark if additional numbers attached

Enter either the Patent Application Number or the Patent Number (DO NOT ENTER BOTH numbers for the same property).

## Patent Application Number(s)

## Patent Number(s)

09/557,262						

## Patent Cooperation Treaty (PCT)

Enter PCT application number  
only if a U.S. Application Number  
has not been assigned.

PCT		PCT		PCT	
PCT		PCT		PCT	

## Number of Properties

Enter the total number of properties involved.

#

## Fee Amount

Fee Amount for Properties Listed (37 CFR 3.41):

\$ 40.00

Method of Payment: Enclosed ☒Deposit Account ☐

## Deposit Account

(Enter for payment by deposit account or if additional fees can be charged to the account)

Deposit Account Number # 20-0531

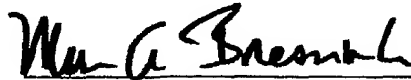
Authorization to charge additional fees: Yes ☒ No ☐

## Statement and Signature

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document. Charges to deposit account are authorized, as indicated herein.

Maureen A. Bresnahan

Name of Person Signing



Signature

October 12, 2000

Date



PATENT

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**Submission Type**

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**Resubmission (Non-Recordation)**Document ID#: **Correction of PTO Error**Serial #:  Frame #: **Corrective Document**Serial #:  Frame #: **Conveyance Type****Assignment****License****Merger****Security Agreement****Change of Name****Other** **U.S. Government**

(For use ONLY by U.S. Government Agencies)

**Departmental File****Secret File****Conveying Party(ies)****Mark if additional names of conveying parties attached**

Name	Execution Date		
	Month	Day	Year
Robert D. Rosenberg	8	21	2000
Nicholas W. Schworak	9	7	2000
Jian Liu	8	23	2000
Linda M.S. Fritze	8	31	2000
John J. Schwartz	8	16	2000
Lijuan Zhang	9	29	2000

**Receiving Party****Mark if additional names of receiving parties attached**Name (line 1)  Massachusetts Institute of TechnologyName (line 2)  77 Massachusetts AvenueAddress (line 1) Address (line 2) Address (line 3)  Cambridge

City

 MA

State/Country

 02139

Zip Code



If document to be recorded is an assignment and the receiving party is not domiciled in the United States, an appointment of a domestic representative is attached. (Designation must be a separate document from Assignment)

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## Patent Number(s)

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PCT

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Enter the total number of properties involved.

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Fee Amount for Properties Listed (37 CFR 3.41):

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Enclosed ☒Deposit Account ☐

Deposit Account

(Enter for payment by deposit account or if additional fees can be charged to the account)

Deposit Account Number

# 20-0531

Authorization to charge additional fees:

Yes ☒ No ☐

## Statement and Signature

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document. Charges to deposit account are authorized, as indicated herein.

Maureen A. Bresnahan

Name of Person Signing



Signature

October 12, 2000

Date

ASSIGNMENT

WHEREAS, We, Robert D. Rosenberg, Nicholas W. Shworak, Jian Liu, Linda M.S. Fritze, John J. Schwartz and Lijuan Zhang have invented one or more improvements in:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFOTRANSFERASES, AND USES THEREFOR described in applications (or provisional applications) for Letters Patent:

☐ identified by Attorney Docket No. \_\_\_\_\_, and/or executed by us of even date herewith and about to be filed in the United States Patent Office;

☒ Serial No. 09/557,262 filed in the United States Patent Office on April 24, 2000; and

WHEREAS, Massachusetts Institute of Technology (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts, and having a usual place of business at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139 desires to acquire an interest therein, in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns, and legal representatives, our entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to the inventions described in said application, together with our entire right, title and interest in and to said application and such Letters Patent as may issue thereon or claim priority under international convention, including but not limited to continuations, divisionals, reissues, and reexaminations of said application of such Letters Patent; said inventions, applications and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey all of our rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of our entire right, title and interest in and to said inventions, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all Letters Patent to ASSIGNEE for its own name as assignee of our entire right, title and interest therein.

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns, and legal representatives, but at its or their expense and charges, including: the execution of applications for patents in foreign countries; the execution of substitution, reissue, divisional or continuation applications; and preliminary or other statements or the giving of testimony in any interference or other proceeding in which said inventions or any application or patent directed thereto may be involved; and we further hereby authorize ASSIGNEE or its attorneys or agents to insert the correct serial number and filing date into this assignment, if none is indicated on that date of our execution of this assignment;

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals the date set forth below.

Inventor: Robert D. Rosenberg  
Robert D. Rosenberg

Commonwealth of Massachusetts )  
County of Middlesex ) ss

Subscribed and sworn to before me, by the above-named Robert D. Rosenberg this 21<sup>st</sup> day of August, 2000.

James D. Frenier  
Notary Public.  
My Commission Expires: My Commission Expires March 30, 2001

Inventor: \_\_\_\_\_  
Nicholas W. Shworak

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Nicholas W. Shworak this \_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Jian Liu

State of North Carolina )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Jian Liu this \_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Linda M.S. Fritze

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Linda M. S. Fritze this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
John J. Schwartz

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named John J. Schwartz this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Lijuan Zhang

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Lijuan Zhang this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

ASSIGNMENT

WHEREAS, We, Robert D. Rosenberg, Nicholas W. Shworak, Jian Liu, Linda M.S. Fritze, John J. Schwartz and Lijuan Zhang have invented one or more improvements in:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFOTRANSFERASES, AND USES THEREFOR  
described in applications (or provisional applications) for Letters Patent:

☐ identified by Attorney Docket No. \_\_\_\_\_, and/or executed by us of even date herewith  
and about to be filed in the United States Patent Office;

☒ Serial No. 09/557,262 filed in the United States Patent Office on April 24, 2000; and

WHEREAS, Massachusetts Institute of Technology (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts, and having a usual place of business at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139 desires to acquire an interest therein, in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns, and legal representatives, our entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to the inventions described in said application, together with our entire right, title and interest in and to said application and such Letters Patent as may issue thereon or claim priority under international convention, including but not limited to continuations, divisionals, reissues, and reexaminations of said application of such Letters Patent; said inventions, applications and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey all of our rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of our entire right, title and interest in and to said inventions, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all Letters Patent to ASSIGNEE for its own name as assignee of our entire right, title and interest therein.

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns, and legal representatives, but at its or their expense and charges, including: the execution of applications for patents in foreign countries; the execution of substitution, reissue, divisional or continuation applications; and preliminary or other statements or the giving of testimony in any interference or other proceeding in which said inventions or any application or patent directed thereto may be involved; and we further hereby authorize ASSIGNEE or its attorneys or agents to insert the correct serial number and filing date into this assignment, if none is indicated on that date of our execution of this assignment;

Joint Assignment  
Serial No.: 09/557,262  
Page 2

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives.


*IN TESTIMONY WHEREOF*, we have hereunto set our hands and affixed our seals the date set forth below.

Inventor: \_\_\_\_\_  
Robert D. Rosenberg

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

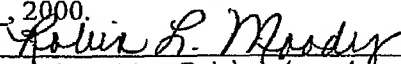
Subscribed and sworn to before me, by the above-named Robert D. Rosenberg this \_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor:   
Nicholas W. Shworak

Commonwealth of Massachusetts )  
County of Suffolk ) ss

Subscribed and sworn to before me, by the above-named Nicholas W. Shworak this 7th day of September, 2000.

  
Notary Public Robin L. Moody  
My Commission Expires: 11-12-2005

Inventor: \_\_\_\_\_  
Jian Liu

State of North Carolina )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Jian Liu this \_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Linda M.S. Fritze

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Linda M. S. Fritze this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
John J. Schwartz

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named John J. Schwartz this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Lijuan Zhang

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Lijuan Zhang this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

ASSIGNMENT

WHEREAS, We, Robert D. Rosenberg, Nicholas W. Shworak, Jian Liu, Linda M.S. Fritze, John J. Schwartz and Lijuan Zhang have invented one or more improvements in:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFOTRANSFERASES, AND USES THEREFOR  
described in applications (or provisional applications) for Letters Patent:

☐ identified by Attorney Docket No. , and/or executed by us of even date herewith  
and about to be filed in the United States Patent Office;

☒ Serial No. 09/557,262 filed in the United States Patent Office on April 24, 2000; and

WHEREAS, Massachusetts Institute of Technology (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts, and having a usual place of business at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139 desires to acquire an interest therein, in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns, and legal representatives, our entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to the inventions described in said application, together with our entire right, title and interest in and to said application and such Letters Patent as may issue thereon or claim priority under international convention, including but not limited to continuations, divisionals, reissues, and reexaminations of said application of such Letters Patent; said inventions, applications and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey all of our rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of our entire right, title and interest in and to said inventions, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all Letters Patent to ASSIGNEE for its own name as assignee of our entire right, title and interest therein.

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns, and legal representatives, but at its or their expense and charges, including: the execution of applications for patents in foreign countries; the execution of substitution, reissue, divisional or continuation applications; and preliminary or other statements or the giving of testimony in any interference or other proceeding in which said inventions or any application or patent directed thereto may be involved; and we further hereby authorize ASSIGNEE or its attorneys or agents to insert the correct serial number and filing date into this assignment, if none is indicated on that date of our execution of this assignment;



AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives.

*IN TESTIMONY WHEREOF*, we have hereunto set our hands and affixed our seals the date set forth below.

Inventor: \_\_\_\_\_  
Robert D. Rosenberg

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Robert D. Rosenberg this \_\_\_\_\_ day  
of \_\_\_\_\_, 2000.


\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Nicholas W. Shworak

Commonwealth of Massachusetts )  
County of ) ss

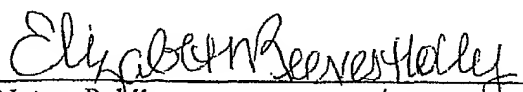
Subscribed and sworn to before me, by the above-named Nicholas W. Shworak this  
\_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor:   
Jian Liu

State of North Carolina )  
County of ) ss

Subscribed and sworn to before me, by the above-named Jian Liu this 23 day of  
August, 2000.

  
Notary Public  
My Commission Expires: 10/2002

Inventor: \_\_\_\_\_  
Linda M.S. Fritze

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Linda M. S. Fritze this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
John J. Schwartz

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named John J. Schwartz this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Lijuan Zhang

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Lijuan Zhang this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

ASSIGNMENT

WHEREAS, We, Robert D. Rosenberg, Nicholas W. Shworak, Jian Liu, Linda M.S. Fritze, John J. Schwartz and Lijuan Zhang have invented one or more improvements in:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFOTRANSFERASES, AND USES THEREFOR  
described in applications (or provisional applications) for Letters Patent:

☐ identified by Attorney Docket No. \_\_\_\_\_, and/or executed by us of even date herewith and about to be filed in the United States Patent Office;

☒ Serial No. 09/557,262 filed in the United States Patent Office on April 24, 2000; and

WHEREAS, Massachusetts Institute of Technology (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts, and having a usual place of business at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139 desires to acquire an interest therein, in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns, and legal representatives, our entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to the inventions described in said application, together with our entire right, title and interest in and to said application and such Letters Patent as may issue thereon or claim priority under international convention, including but not limited to continuations, divisionals, reissues, and reexaminations of said application of such Letters Patent; said inventions, applications and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey all of our rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of our entire right, title and interest in and to said inventions, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all Letters Patent to ASSIGNEE for its own name as assignee of our entire right, title and interest therein.

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns, and legal representatives, but at its or their expense and charges, including: the execution of applications for patents in foreign countries; the execution of substitution, reissue, divisional or continuation applications; and preliminary or other statements or the giving of testimony in any interference or other proceeding in which said inventions or any application or patent directed thereto may be involved; and we further hereby authorize ASSIGNEE or its attorneys or agents to insert the correct serial number and filing date into this assignment, if none is indicated on that date of our execution of this assignment;

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives.

*IN TESTIMONY WHEREOF*, we have hereunto set our hands and affixed our seals the date set forth below.

Inventor: \_\_\_\_\_  
Robert D. Rosenberg

Commonwealth of Massachusetts     )  
County of                                 ) ss

Subscribed and sworn to before me, by the above-named Robert D. Rosenberg this \_\_\_\_\_ day  
of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Nicholas W. Shworak

Commonwealth of Massachusetts     )  
County of                                 ) ss

Subscribed and sworn to before me, by the above-named Nicholas W. Shworak this  
\_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Jian Liu

State of North Carolina                 )  
County of                                 ) ss

Subscribed and sworn to before me, by the above-named Jian Liu this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor:

Linda M.S. Fritze  
Linda M.S. Fritze

Commonwealth of Massachusetts )  
County of Suffolk ) ss

Subscribed and sworn to before me, by the above-named Linda M. S. Fritze this 31st  
day of August, 2000.

Robin L. Moody  
Notary Public Robin L. Moody  
My Commission Expires: 11-12-2005

Inventor:

John J. Schwartz

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named John J. Schwartz this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor:

Lijuan Zhang

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Lijuan Zhang this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

ASSIGNMENT

WHEREAS, We, Robert D. Rosenberg, Nicholas W. Shworak, Jian Liu, Linda M.S. Fritze, John J. Schwartz and Lijuan Zhang have invented one or more improvements in:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFOTRANSFERASES, AND USES THEREFOR  
described in applications (or provisional applications) for Letters Patent:

☐ identified by Attorney Docket No. \_\_\_\_\_, and/or executed by us of even date herewith  
and about to be filed in the United States Patent Office;

☒ Serial No. 09/557,262 filed in the United States Patent Office on April 24, 2000; and

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AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives.

*IN TESTIMONY WHEREOF*, we have hereunto set our hands and affixed our seals the date set forth below.

Inventor: \_\_\_\_\_  
Robert D. Rosenberg

Commonwealth of Massachusetts     )  
County of                                 ) ss

Subscribed and sworn to before me, by the above-named Robert D. Rosenberg this \_\_\_\_\_ day  
of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Nicholas W. Shworak

Commonwealth of Massachusetts     )  
County of                                 ) ss

Subscribed and sworn to before me, by the above-named Nicholas W. Shworak this  
\_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Jian Liu

State of North Carolina                 )  
County of                                 ) ss

Subscribed and sworn to before me, by the above-named Jian Liu this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Linda M.S. Fritze

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Linda M. S. Fritze this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
John J. Schwartz

Commonwealth of Massachusetts )  
County of Middlesex ) ss

Subscribed and sworn to before me, by the above-named John J. Schwartz this 16th  
day of August, 2000.

Lee Anne Hampton Battite  
Notary Public  
My Commission Expires: \_\_\_\_\_  
Lee Anne Hampton Battite  
Notary Public  
My Commission Expires  
December 1, 2006

Inventor: \_\_\_\_\_  
Lijuan Zhang

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Lijuan Zhang this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_



ASSIGNMENT

WHEREAS, We, Robert D. Rosenberg, Nicholas W. Shworak, Jian Liu, Linda M.S. Fritze, John J. Schwartz and Lijuan Zhang have invented one or more improvements in:

HEPARAN SULFATE D-GLUCOSAMINYL 3-O-SULFOTRANSFERASES, AND USES THEREFOR

described in applications (or provisional applications) for Letters Patent:

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☒ Serial No. 09/557,262 filed in the United States Patent Office on April 24, 2000; and

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Joint Assignment  
Serial No.: 09/557,262  
Page 2

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives.

*IN TESTIMONY WHEREOF*, we have hereunto set our hands and affixed our seals the date set forth below.

Inventor: \_\_\_\_\_  
Robert D. Rosenberg

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Robert D. Rosenberg this \_\_\_\_\_ day  
of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Nicholas W. Shworak

Commonwealth of Massachusetts )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Nicholas W. Shworak this  
\_\_\_\_\_ day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: \_\_\_\_\_  
Jian Liu

State of North Carolina )  
County of \_\_\_\_\_ ) ss

Subscribed and sworn to before me, by the above-named Jian Liu this \_\_\_\_\_ day of  
\_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: Linda M.S. Fritze

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Linda M. S. Fritze this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: John J. Schwartz

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named John J. Schwartz this \_\_\_\_\_  
day of \_\_\_\_\_, 2000.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

Inventor: Lijuan Zhang  
Lijuan Zhang

Commonwealth of Massachusetts )  
County of ) ss

Subscribed and sworn to before me, by the above-named Lijuan Zhang this 29th day of  
September, 2000.

Dikual Ann Sylvia  
Notary Public  
My Commission Expires: 8/18/2006